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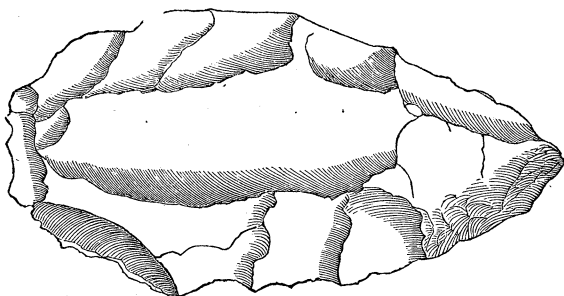
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terized by magnifying ten diameters as used in the compound microscope, or should it be compared to a simple lens of actually measured focus or foci? Should the objective be named by its equivalent focal length, or by its amplifying power, or both? Should our standard distance of measurement be changed from ten inches (254 millimetres) to nine and five-sixths inches (250 millimetres)? From what point in the objective shall the distance to the scale be measured? At what point of screw-collar adjustment shall the objective be placed for rating its angular aperture and amplifying power? Should the name *ocular* be substituted for "eye-piece" in general use?

THE STONE AGE IN NEW JERSEY.

BY CHARLES C. ABBOTT, M.D.

Fig. 9.

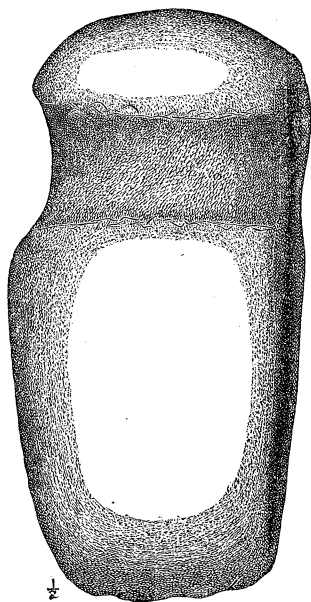


1-2 natural size.

THERE are many people still living who remember the Indians in New Jersey, the last remnant of the once mighty tribe, the Lenni Lenape; and to-day scattered all over the state, from the mountains of Sussex to the sea-beach of Cape May, are to be found stone weapons and implements, popularly considered as once the property of these aborigines, and by them fashioned in all the varied shapes, sizes and of the various minerals that we now find. Axes, arrow-heads, lance-heads, javelins, harpoons, spears, knives, scrapers, hammers, adzes, mortars and pestles, pipes, amulets and puzzling shapes of chipped jasper; all these, in varying numbers are

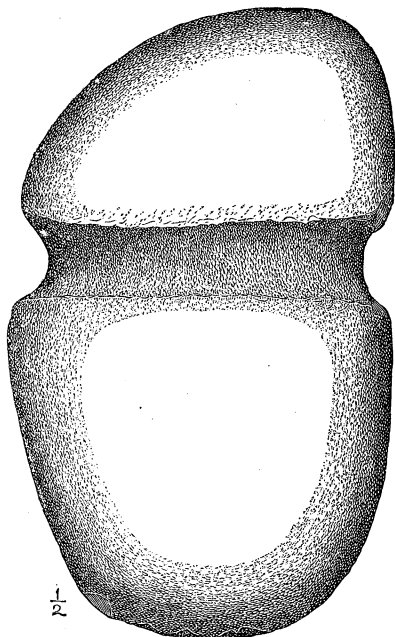
yearly turned up by the plough, gathered as "curiosities," or momentarily gazed upon and thrown aside to turn up again, more broken than before, and so more a puzzle to him who finds them. Again, at odd times, a "deposit" is met with, deep in the soil and a neighborhood may have the even tenor of its way disturbed by the wise comments of village sages, who ponder gravely over the "injin things" and never think to preserve them. A record of a number of these "finds," however, has put us in possession

Fig. 10.



1-2 natural size.

Fig. 11.

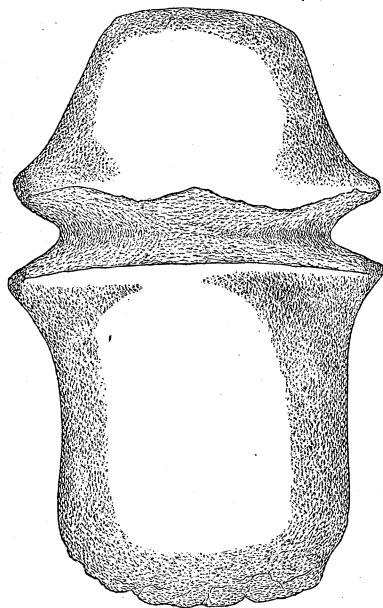


1-2 natural size.

of this fact, that the banks of our rivers and larger creeks were the favorite localities of these people of the stone age,—these Indians, if you choose—a people who had at no time a knowledge of metals, unless perhaps they utilized the many masses of native copper, which even a century ago were still to be found in some localities (neighborhood of New Brunswick, Middlesex and Somerset counties). There are yet savages in their stone age; and it was not many centuries ago that a people along the Delaware River fashioned from its sandstone and porphyry peb-

bles the weapons and implements their primitive wants suggested. These "relics" are now (with exceptions to be mentioned hereafter) surface-found specimens; but when a hundred or more are gathered together and carefully compared, we must come to one of two conclusions; either that there were many execrable workmen among their tool makers; or that the age of the crude specimens far exceeds that of the

Fig. 12.



1-2 natural size.

finely wrought relics. Compare the rude implement (Fig. 9) and the finely polished axe (Fig. 15). Both of these were found on the surface, yet we can scarcely imagine that a people who could fashion the latter, would deign to utilize the former. Take a series of whatever class of relics you may, there is always a gradation from poor (primitive) to good (elaborate), which is an indication, we believe, of a lapse of years from very ancient to more modern times, from a palæolithic to a neolithic age; and long after the introduction of metals, the choicer stone weapons were probably retained, and new ones continually manufactured.

Arrow heads of stone, we know, are still in use. If this surmise be correct, if a people as rude as they who fashioned the wrought flints found at St. Acheul, near Amiens, France,* once dwelt on the shores of the Delaware, and the relics are as rude as those mentioned above, were not such a people too primitive to wander from another continent? We believe this and consider the first inhabitants along our Atlantic coast and inland to have been autochthones,† and that *their* "flint chips" are now found

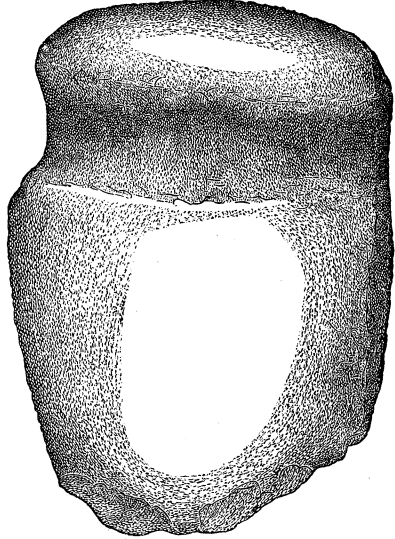
* Nilsson on the Stone Age. Edited by Sir J. Lubbock. Page xix, fig. 2. 3d Ed. 1868.

† We judge of our "Indians" by those relics that are now the only trace of their former existence, and finding stone implements as rude as those of Abbeville and Hoxne (see Lubbock's Prehistoric times), we naturally conclude that the fashioners of such "flints" were so primitive as to be incapable of a migration from Asia, and

mingled with the more elaborate stoneware of their descendants ; the so-called Indians of to-day.

Having made a collection of these stone implements and weapons, it was natural to attempt to classify them at once, and when we speak of things so dissimilar as axes and arrow heads, it seems strange that there should be any doubt at times, whether any particular specimen should belong to one class or the other ; yet we have met with such specimens, and our cabinet contains an unbroken series from the latter to the former, from triangular arrow heads, whose three sides scarce measure an inch, to jasper hatchets(?) a foot in length ; and these hatchets run as gradually into axes, as the arrow points cease to be such, and are javelins, lance heads, harpoons or spears, as fancy dictates.

Fig. 13.

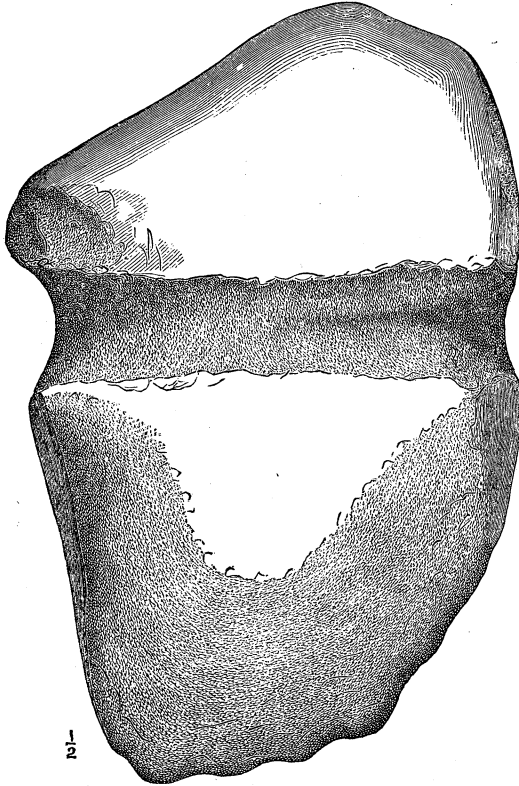


Natural size.

through a country so bleak as to offer no inducement to leave a more congenial climate. However, the Esquimaux seem to be contented where they are, but they are a very different people from the so-called "Indians." We cannot but think that there was an autochthonic people here in North America, and if an Asiatic people migrated hither, they drove away or absorbed the primitive race that utilized such rude implements, as one especially, that we have figured. We do not hesitate to state such to be our belief, notwithstanding we find Baron Bunsen saying, "The linguistic data before us [speaking of Schoolcraft's work on Indians], combined with the traditions and customs and, particularly, with the system of pictorial mnemonic writing (first revealed in this work), enable me to say that the Asiatic origin of all these tribes is as fully proved as the unity of family among themselves." Sir John Lubbock says (*Origin of Civilization*; Amer. ed., p. 345), "It is my belief that the great continents were already occupied by a wide spread, though sparse, population, when man was no more advanced than the lowest savages of to-day, and although I am far from believing that the various degrees of civilization which now occur can be altogether accounted for by the external circumstances as they at present exist, still these circumstances seem to me to throw much light on the very different amount of progress which has been attained by different races." That is the migration from Asia that Bunsen claimed has absorbed the preëxisting race, but has not obliterated all traces of such autochthonic people,—we say autochthonic, but if all mankind sprung from some catarrhine ape of the Old World, a migration to America must have occurred ; but this is going so far back into the past, that the relative positions of continent and ocean may have been widely different from what now exists, or existed when Bunsen would date the Turanian migration from Asia.

The large jasper implement or weapon, fig. 22, may have been a hatchet, lance head or skin dresser, for that matter, and the works and figures of ethnologists do not help us much in deciding. It would be a great gain to the subject, had each of these various forms of "flint implements" a representative in the tools

Fig. 14.



1-2 natural size.

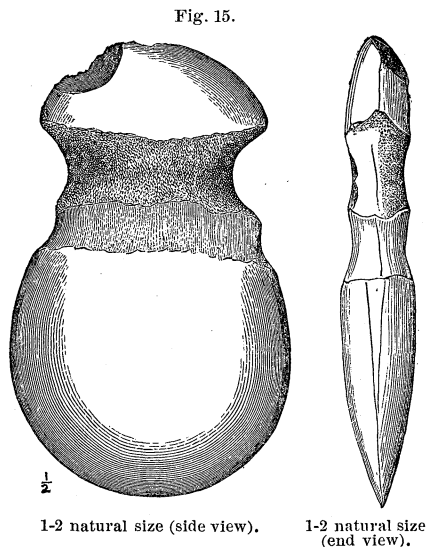
and weapons of some savage race now living. Such not being the case, however, conjecture must go a great way in deciding upon their use, and so suggest names by which they shall be known. With these prefatory remarks, we will now undertake a classification of the collection, upon which the remarks in this article are based; commencing with the large grooved and polished stones, popularly known as

AXES.— For convenience of description, we

will separate our "axes" into two classes, axes proper and hatchets; the former being a water-worn stone that is provided with an edge and blunt back; grooved or not grooved, for a handle; and the latter being cutting implements of one or more edges; without any hammer-like part, having been always broken from a mass of flinty rock and chipped into the desired shape.

We will now again divide the axes proper into grooved and

not grooved,* and illustrate the various shapes that occur in varying numbers. A majority of the axes found in New Jersey are water-worn pebbles of sandstone, porphyry, granite, serpentine, etc., that have originally borne more or less resemblance to some one of the shapes then in use: Such cobble stones are usually grooved, on each side and beneath, and the stone worn smooth upon the upper edge (Fig. 10), which is a common shape; or the groove circles the stone (Fig. 11). In a number of specimens, the original surface of the stone has been ground or chipped away from the groove making it a more marked feature in the implement (Fig. 12). This specimen has had considerable work put upon it, as is seen by the general elegance of the outline. There is no indication of its having once been polished; and the edge, which is now mutilated, was probably never very sharp. As a rule, these cobble stone axes are not polished except upon the edge; the axe (Fig. 10) and the beautiful specimen (Fig. 15) being exceptions. In size, axes of this description vary very much,

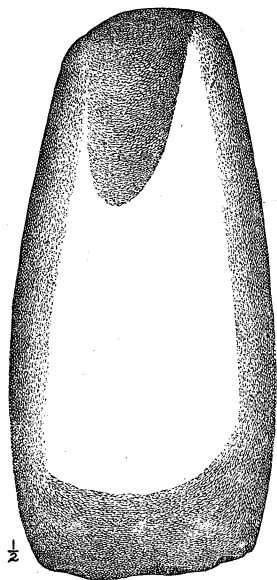


the little specimen (Fig. 13) being but three inches in length by two in breadth, and is the smallest grooved example that we have. It is of sandstone, and a repetition in outline of the more accurately made specimen (Fig. 10). On the other hand, the uncouth axe (Fig. 14) is an example of the maximum size of this style. While this specimen, unquestionably, is an axe, it is of such rude workmanship, that we can scarcely imagine any man so primitive, as to be willing to make use of it. Its greatest length

* We will not include perforated stone axes in our description. That they occur occasionally in New Jersey is probable from the fact of other perforated stones occurring, but we have never met with a specimen.

is eight inches ; greatest width five inches. In thickness the stone varies little from two inches. The cutting edge has been broken off too much to determine if it was ever very sharp or not. The grooved axe (Fig. 15), found in Salem county, New Jersey, is the handsomest specimen we have ever met with. As will be seen in the drawing, it has a second slight groove or depression in front of the main one intended for the handle fastenings. The whole surface has been beautifully polished, the edge is still perfect, equidistant from each side, and describing a very nearly accurate

Fig. 16.



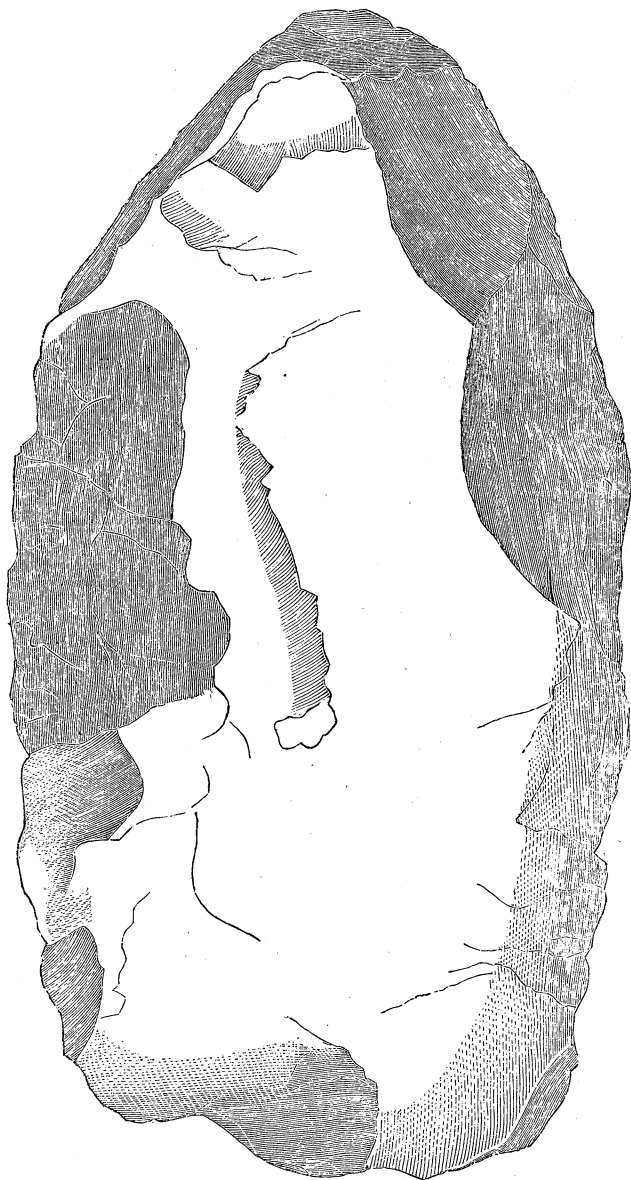
1-2 natural size.

circle. Comparing such beautiful workmanship as this with the rude axe (Fig. 14) we can scarcely believe men of the same day and generation used them both.

We will now take up axes without grooves, and find at the outset that they are neither as numerous nor as varied in outline as the grooved, cobble stone specimens. Ungrooved axes, however, are more generally polished, have better defined edges, and usually the end opposite the cutting edge is more or less pointed. The specimen (Fig. 16) is typical of the great majority of smooth, ungrooved axes as found in New Jersey. They vary but little from this in shape or size, some few being but one half its length and the back tapered to a rather sharp point. The dimensions of this specimen are: greatest length,

six inches ; greatest width, scant three inches ; thickness in centre, one inch and a half. Occasionally, an axe of this shape was chipped out, and the beautiful mass of many colored jasper (Fig. 17) is an illustration of this fact. Rough in outline as it unquestionably is, its intended use is unmistakable. As the chipped edge extends beyond the end, both above and below, it may be that it should have been classed as a hatchet. It forms a good connecting link between these two forms. Of small axes we have three fine specimens that present a good idea of the prevailing styles of small weapons. The axe (Fig. 18) is of por-

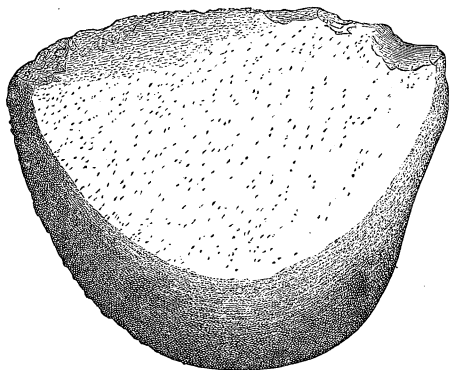
Fig. 17.



Natural size.

phyry, and has been very carefully chipped and ground from a water-worn pebble such as are now so very abundant in the bed and along the shores of the Delaware River, at and below Tren-

Fig. 18.

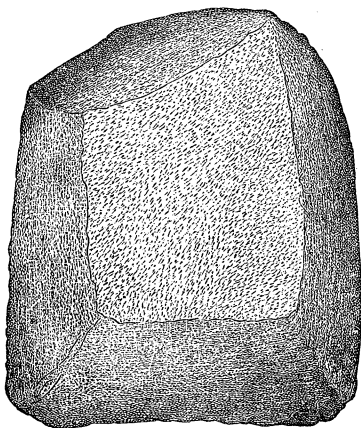


Natural size.

ton, N. J. Prof. Nilsson (vide "Stone Age in Scandinavia") would call this specimen a wedge, undoubtedly, and such may have been its use. It certainly does not appear to us how a handle could have been attached to it; but its cutting edge, which has been sharp, has induced our calling it an axe. Its length is about two inches, and its breadth two

and one-quarter inches; its thickness at the commencement of the polished surfaces one and three-eighths inches. Another small axe, of rare shape, is that figured next (Fig. 19). It is of a fine grained porphyritic stone and has been polished over its whole surface. Its dimensions are nearly the same as the preceding, though it is not quite as wide as the former. The cutting edge was originally good. The back has a ridge running obliquely across it, from which the surfaces slope at angles of forty-five degrees. Had this been used as a wedge for splitting wood, certainly the back is not favor-

Fig. 19.

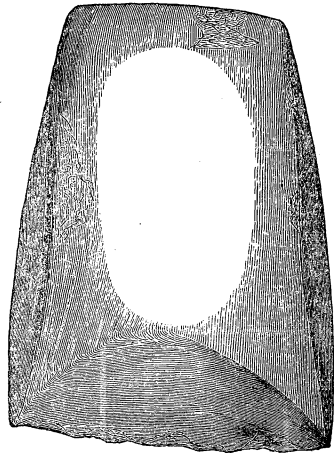


Natural size.

ably fashioned for receiving a hard blow; and the ridge, which in that case would have been much battered, in this specimen is still in moderately good state of preservation. This double faced condition of the backs of axes is not unfrequent among the

grooved cobble stone specimens. A third specimen of diminutive axe is that given in Fig. 20. It is of a chocolate colored slate not commonly found in use among our antiquities. It has been very carefully polished and probably had a fine edge. Its size varies little from the preceding, and its general appearance rather indicates it as an ornament, "a victory stone or charm," rather than a weapon. They are not uncommon, and sometimes occur of a somewhat smaller size. Lastly, we figure (Fig. 21) a very rude axe or that and hatchet combined. As will be seen by the illustration, it presents many points of resemblance to both a hatchet proper and a spear head. That it is not the latter, however, is evident from the fact that the base, being the natural surface of the stone, is uncut, and sufficiently broad to enable the specimen to stand upon it on a level surface. The cutting edge being on both sides and running into an obtuse point, gives some points in common with a hatchet. It is, perhaps, even more than the jasper specimen (Fig. 17), a connecting link between axes and hatchets, and to these we will now direct our attention.

Fig. 20.

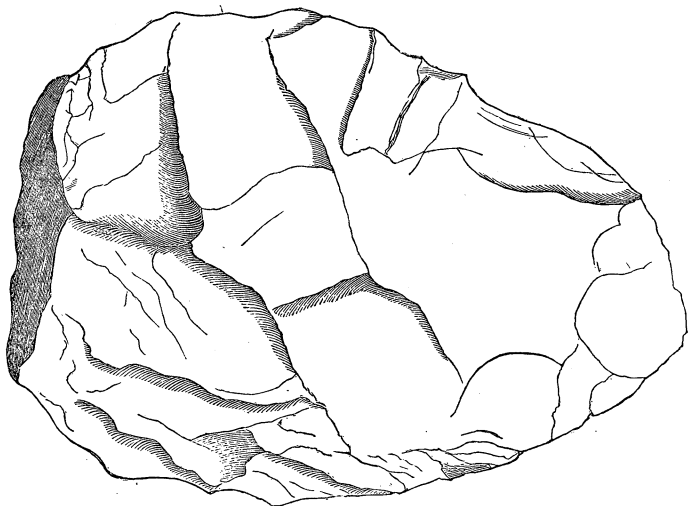


Natural size.

HATCHETS.—What we here designate as hatchets, as distinguished from axes, are carefully cut jasper specimens, having no blunt edge with which to give or receive a hammer-like blow. They are usually smaller than axes and vary less in shape. Before going into details with reference to the jasper specimens, we will mention the crude hatchet (Fig. 9) and ask a comparison of it with the plate of a flint instrument given by Lubbock in Nilsson's "Stone Age." (See foregoing foot-note.) We consider this a very ancient "implement," and it is one of several that rolled out of the gravelly bluff that skirts the Delaware River near Trenton, N. J. Having no blunt edge, we call it a hatchet, and from it have in succeeding years been evolved, through accumulated skill, the more elaborate specimens. Prominently in this list stands the magnifi-

cent brown jasper specimen (Fig. 22). There we have a carefully chipped hatchet, well edged on all sides, of a nearly perfect oval outline. Its greatest width three and three-quarters inches; greatest length, six inches; and scant three-quarters of an inch in greatest thickness. This specimen is one of one hundred and fifty that were discovered in ploughing a piece of newly drained meadow near Trenton, N. J. The one figured is somewhat shorter and broader than the others, which might have been hatchets or lance heads.* They were buried points up, and were surrounded by a sufficient number of them to wall in and hold the erect ones

Fig. 21.

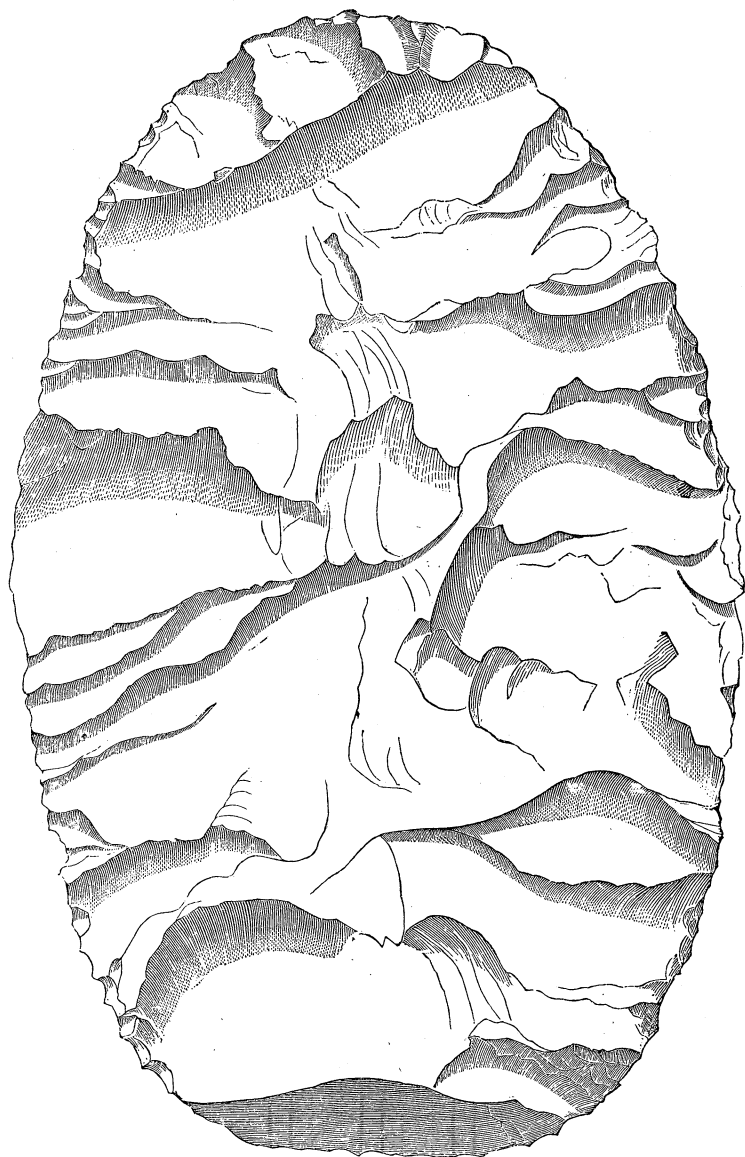


Natural size.

in position, had they been placed at the time on the surface. It is a little curious that we have as yet met with no isolated specimen similar to those in this "deposit." The bulk of the collection was presented to the Philadelphia Academy; and after many were stolen from that institution, the remainder were deposited for safe keeping with the American Philosophical Society, where they now are. Figures 23 and 24 we have also designated as hatchets, although the specimen (Fig. 24) is marvellously like the Esquimaux scraper, as figured in Sir John Lubbock's "Prehistoric Times" (3d ed., page 93, figs. 105-7), though just double the size; but

* Abbott on "Lance heads," in Proc. Acad. Nat. Sci. of Philadelphia, 1863, p. 278.

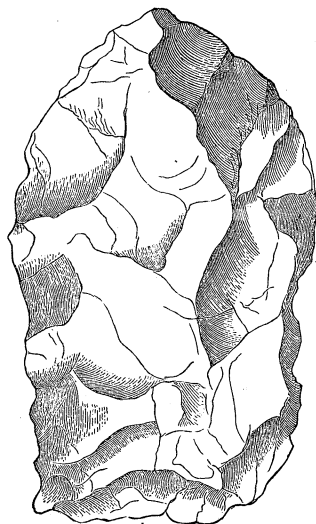
Fig. 22.



Natural size.

there is just this difference between modern or prehistoric scrapers and the implements we here designate as hatchets, *i.e.*, that the former have one flat, smooth surface, the plane of a single cleavage, the split of a single blow; while the hatchets have an edge, bevelled from each side, which are both equally well and uniformly chipped. These more elaborate "hatchets," however, may have been used as scrapers. The more usual sizes of hatchets are those illustrated by figures 25 and 26. These give the average outlines also of a series of nearly thirty gathered from one field. Their size should be no objection to the proposition that they were used as

Fig. 23.



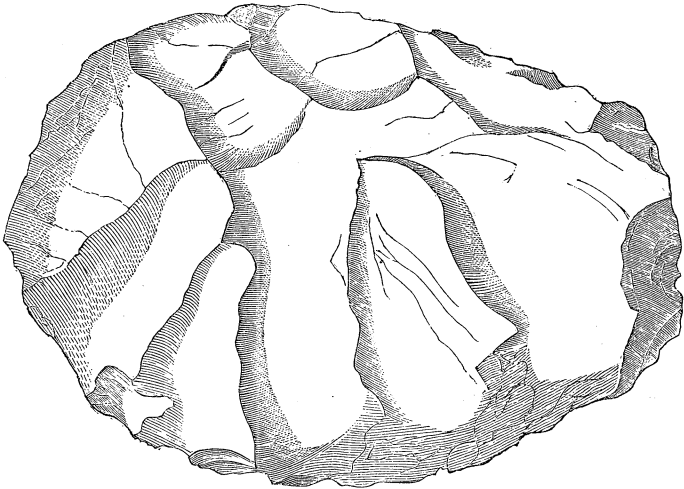
Natural size.

cutting tools. We have already seen that axes are equally small. Lubbock figures one from Ireland, in "Prehistoric Times," fig. 98, which is as small; and on page 182, speaking of Swiss axes, says, "with few exceptions they were small, especially when compared with the magnificent specimens from Denmark; in length they varied *from six inches to one*, while the cutting edge had generally a width of from fifteen to twenty lines;" and again on page 93, speaking of so-called "axes" or hatchets of the Kjökkenmöddings, says "they are . . . rudely triangular or quadrangular in shape, with a cutting edge at the broader end, and two and a half to five and a half inches in length, with a breadth of one and a

half to two and a half inches." Now the New Jersey specimens differ only in this, that both sides are chipped, but otherwise they are identical. As we have abundant reasons for knowing that mussels were a favorite food, they may have been used to crush their shells, having been found with heaps of half burned mussel-shells; and certainly, inserted in a handle by securely fastening the smaller or tapering end therein, they would make a formidable weapon. A tomahawk, for instance, to be worn in a belt and used in close combat, when the bow failed or the quiver of arrows was exhausted.

In conclusion we would call attention to the rude green jasper hatchet (Fig. 27), that has an edge derived from a large chip

Fig. 24.

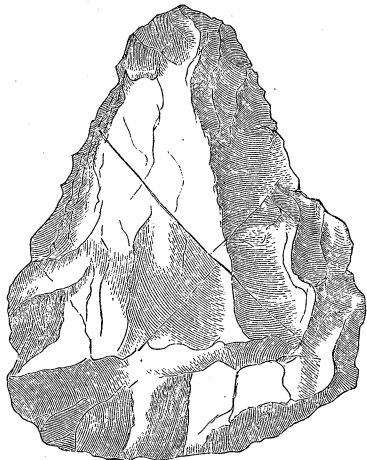


Natural size.

having been struck off, giving on one side a smooth surface, which edge meets with the opposite more gradually wrought surface. This specimen agrees more than any we have seen with the Kjökkenmödding axes; and we call attention to the similarity of our specimen with that figured in "Prehistoric Times," plate 1, fig. 8.

HAMMERS.—There are occasionally met with, lying upon the surface of our fields, slender oval stones, with a groove entirely around them, which would be good axes had they any cutting surface. Such is not the case, however, and their use as hammers is unquestionable. Such specimens are well represented by the one given in Fig. 28. This hammer is seven

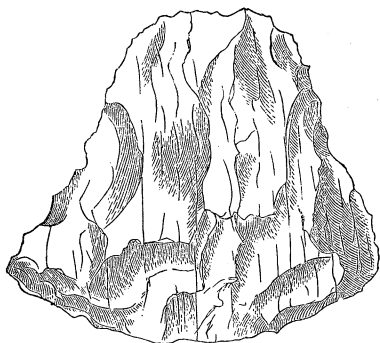
Fig. 25.



Natural size.

inches long and about three wide. Others occur somewhat larger, but there is no other important variation. Occasionally, an unusually shaped stone will be found to have been utilized as a hammer,

Fig. 26.



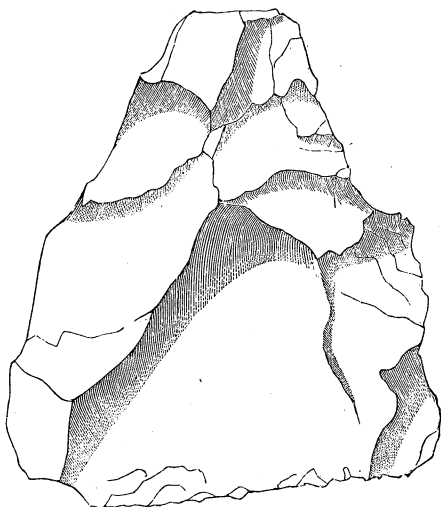
Natural size.

having required but little alteration to convert it into the required shape. Such an one is that given in (Fig. 30), ten and one-half inches in length, with a handle about one-third of its total length; it has had a sort of edge, never less than one-quarter of an inch in width, chipped upon it. The handle has been somewhat ground down, but not polished in any degree. Securely fastened to a handle, this hammer,

well directed, would give an opponent a fearful blow, but we imagine they were not used as weapons, but as hammers only; and this belief is the more strengthened by the equally abundant presence of partially polished, oval cobble stones, which we believe can be best designated, considering all things, as

CHISELS. — Such a chisel is that illustrated here (Fig. 29). This specimen consists of a stone that has had a beautiful cutting edge ground at one end, and *two-thirds of one surface has been*

Fig. 27.



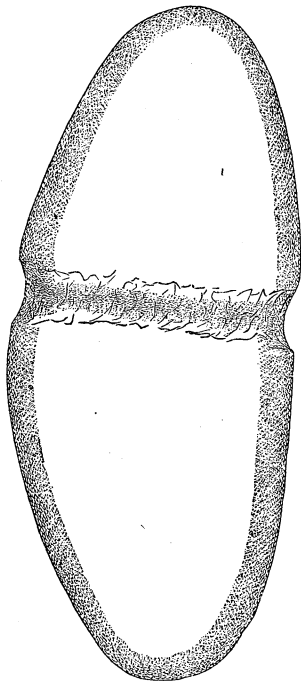
Natural size.

split smoothly off, making it, not a hollow gouge, but a smooth chisel. The under surface is oval, rocking to and fro if agitated while lying on that side. A sufficient number of such specimens

have been found to consider them as we have done above, rather than as adzes, hatchets or ungrooved axes.

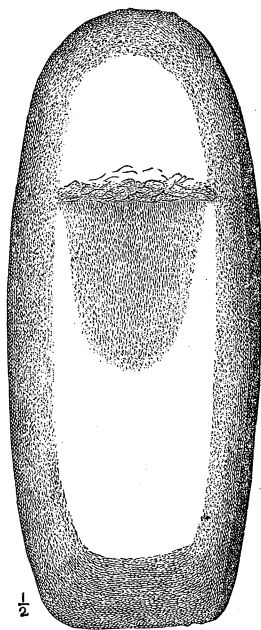
The specimens that we have described so far have been all ordinary surface-found specimens—with one exception—and we cannot see that their use was less apparent for that fact, although a damper is thrown on one's ardor in collecting them, when Sir John Lubbock assures us that "those found singly in this manner have

Fig. 28.



1-2 natural size.

Fig. 29.

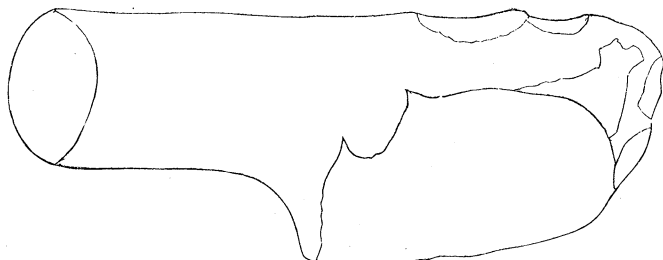


1-2 natural size.

comparatively little scientific value;" but we have not alone met with specimens thus singly found, but have met with several instances where quite large deposits of "axes" have been encountered in digging cellars and similar excavations. For what purpose this was done, nothing about "the find" gave any clue. It was only probable that for the sake of concealment from enemies or other purpose, a considerable excavation had been made and these axes therein deposited. In one case, in digging a cellar in Trenton, N. J., one-hundred and twenty were found. Again, in excavating the

"receiving vault" of the Riverview Cemetery, near Trenton, "a bushel basket full of axes were found, packed close together and six feet under ground." On the face of the bluff fronting the Delaware River below Trenton, several instances have come under the notice of the author. In the first two instances, the specimens were *all* grooved cobblestone axes. In one instance, below Trenton, the axes, over fifty, were all of porphyry, and were such as that figured above (Fig. 16). It is not a little strange that in these "finds" of axes, we have as yet invariably failed to meet with any other

Fig. 30.



1-3 natural size.

class of tools or weapons. One word as to "inscribed axes," such as that figured in "Dr. Wilson's Prehistoric Man" (2d ed. page 412, Fig. 49). When we remember that axes such as these have been for nearly two centuries (150 years at least) exposed twice yearly to the scratching of a plow, it is not strange that they should ultimately become considerably "inscribed;" and we can find a happy combination of Phœnician, Arabic, Hebraic and other letters scratched here and there over the surface of many specimens, although not with the astonishing regularity of that given in the figure above quoted of the axes from Pemberton, Burlington Co., New Jersey. — *To be continued in next number.*

REVIEWS AND BOOK NOTICES.

A NEW CATALOGUE OF BUTTERFLIES.*—More than twenty years ago Messrs Doubleday and Hewitson, in their classic work "The genera of diurnal Lepidoptera," commenced a synonymic list of

*A Synonymic Catalogue of Diurnal Lepidoptera, by W. F. Kirby, 8vo, London, 1871, pp. viii, 690.